February 5, 2003

Dr. Ronald L. Simard
Nuclear Energy Institute (NEI)
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

SUBJECT: RESOLUTION OF EARLY SITE PERMIT TOPIC 7 (ESP-7), GUIDANCE FOR SATISFYING 10 CFR 52.17(a)(1) REQUIREMENTS

Dear Dr. Simard:

The purpose of this letter is to inform the Nuclear Energy Institute (NEI) of the Nuclear Regulatory Commission's (NRC) understandings and expectations regarding compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) 52.17(a)(1) for early site permit (ESP) applications. This topic, which is identified as ESP-7 on the list of NEI generic ESP issues, was discussed during a public meeting held on December 5, 2002 (Meeting Summary - ADAMS Accession No. ML023540387). Subsequently, NEI documented its position on this topic in a letter dated December 20, 2002. The NRC staff does not entirely concur with the statements and assumptions in your letter.

The NRC's regulations in 10 CFR Part 100, "Reactor Site Criteria," present a framework that guides the Commission in its evaluation of the suitability of proposed sites for stationary power and test reactors. The regulations recognize the importance of accident considerations in reactor siting; hence, a key element is the determination of the size of the exclusion area considering postulated accidents with a large fission product release within containment and the evaluation of the radiological consequences in terms of doses.

Accident considerations historically have been of key importance in reactor siting. Major developments in risk assessment such as the issuance of the Reactor Safety Study (WASH-1400), and NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants," as well as the occurrence of the Three Mile Island accident in 1979, and the accident at Unit 4 of the Chernobyl reactor in the Soviet Union in 1986, have heightened awareness, knowledge, and concerns in this area. Siting factors and criteria are important in assuring that radiological doses from normal operation and postulated accidents will be acceptably low. In 1996, the NRC amended its regulations to update the criteria used in decisions regarding power reactor siting (61 FR 65157). In that rulemaking, the Commission modified source terms and dose calculation requirements that apply primarily to plant design and relocated them into 10 CFR Part 50. Conforming changes were made to 10 CFR Part 52 to reflect these changes. Decoupling siting from design was a long-sought objective, but it was not entirely realized with the 1996 revision to Part 100.

As articulated in Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations, which was revised in conjunction with the 1996 rule, both the exclusion area boundary described by 10 CFR 50.34(a)(1)(ii)(D)(1) and the low population zone described by 10 CFR 50.34(a)(1)(ii)(D)(2) (both of which are defined in 10 CFR 50.2) depend on site

characteristics and aspects of the plant design. In effect, certain elements of siting and design have been inextricably linked and remain so. The staff has been consistent in its view throughout the discussion of this issue and, on more than one occasion, urged the NEI Task Force to reflect on this background.

Dose consequence evaluation factors must be considered as required by 10 CFR 52.17(a)(1). Pursuant to 10 CFR 50.34(a)(1), doses from postulated design basis accidents are calculated for hypothetical individuals, located at any point (generally, the closest point) on (1) the exclusion area boundary for a two-hour period and (2) the outer radius of the low population zone for the course of the accident. The effect of these requirements is to set limits on dose (and on risk) without setting numerical criteria on the size of the exclusion area and low population zone. Whether the dose criteria would be met at the locations where the site atmospheric dispersion factor (χ/Q) does not exceed a certain value must be determined using design information.

Therefore, given the regulatory background stated above, the staff does not agree with certain elements of the NEI approach as described in the letter dated December 20, 2002, for the following reasons:

- An ESP application is an independent licensing action. As such, the associated NRC review will result in safety and environmental impact determinations that will be independent of staff actions that may be taken later during a combined license (COL) application. The staff does recognize that ESP resolutions are final under Section 52.39 and may be excluded from subsequent investigation under other elements of 10 CFR Part 52.

  The NEI approach asserts that "compliance with the radiological consequences in Section 50.34.(a)(1) is determined by the integration of the evaluations performed in the early site permit, standard design certification and combined license." This does not comport with 10 CFR Part 52 which provides that:

  - ESP applications must contain an analysis and evaluation of the major structures, systems, and components of the facility that bear significantly on the acceptability of the site under the radiological consequence evaluation factors identified in Section 50.34(a)(1) [Section 52.17(a)(1)].

  - Design certification (DC) applications must contain (1) the technical information required of applicants for construction permits and operating licenses by 10 CFR Parts 20, 50, and its appendices, [Section 52.47(a)(i)] and (2) the site parameters postulated for the design, and an analysis and evaluation of the design in terms of such parameters [Section 52.47(a)(1)(iii)].

  - COL applications must contain the technical information required of applicants for operating licenses by 10 CFR 50.34 in a final safety report [Section 52.79(b)].

  Therefore, compliance with Section 50.34(a)(1) is required independently for each Part 52 licensing process (i.e., ESP, DC, and COL).

- The NEI approach asserts that "ESP applications are not required to include complete radiological dose consequences." On the contrary, the analysis and evaluation required by Section 52.17(a)(1) are consistent with the evaluation specified in Section 50.34(a)(1)(ii)(D)

for the required exclusion area described by 10 CFR 50.34(a)(1)(ii)(D)(1) and the required low population zone described by 10 CFR 50.34(a)(1)(ii)(D)(2). The stated NEI position is not consistent with:

- ♦ 10 CFR 100.21(c), which states that site atmospheric dispersion characteristics must be evaluated and dispersion parameters established such that:

  (1) Radiological effluent release limits associated with normal operation from the type of facility proposed to be located at the site can be met for any individual located offsite; and

  (2) Radiological dose consequences of postulated accidents shall meet the criteria set forth in Section 50.34(a)(1) of this chapter for the type of facility proposed to be located at the site;

- ♦ Footnote 7 to 10 CFR 50.34(a)(1)(ii)(D)(1), which states that "...its use [whole body dose of 25 rem] is not intended to imply that this number constitutes an acceptable limit for an emergency dose to the public under accident conditions. Rather, this dose value has been set forth in this section as a reference value, which can be used in the evaluation of plant design features with respect to postulated reactor accidents, in order to assure that such designs provide assurance of low risk of public exposure to radiation, in the event of such accidents."

The NRC has an affirmative duty under 10 CFR 52.21 to evaluate whether, taking into consideration the site criteria contained in 10 CFR Part 100, a reactor, or reactors, having characteristics that fall within the parameters for the site can be constructed and operated without undue risk to the health and safety of the public. Therefore, the NRC staff requires complete radiological dose consequence information in order to ascertain the radiological risks associated with the postulated facility.

- NEI states its position that "for a combined license, the site χ/Q will be combined with the release history information provided in a design certification, or approved during the COL review of an uncertified design, to determine whether Part 100 requirements are met." Part 100 requirements, which are defined as the siting requirements for Part 52, are part of the necessary requirements for the Commission to approve "a site or sites for one or more nuclear power facilities separate from the filing of an application for a...combined license for such a facility" [Section 52.11], and therefore, must be addressed at the ESP stage.

- NEI states that "Chi/Q is the site characteristic associated with meeting Part 100 requirements, and ESP applicants using the PPE approach in lieu of specific design information will comply with Section 52.17(a)(1) by determining the site χ/Q, including the effect of SSCs, if any, that bear significantly on the result." As discussed above, this position does not satisfy the regulatory requirements of 10 CFR 52.17(a)(1). Because χ/Q is a site characteristic, it alone cannot be used to meet the criteria for radiological dose consequences of postulated accidents as required by Section 52.17(a)(1) and as set forth in 10 CFR 50.34(a)(1) because both site characteristic and design information are necessary in order to perform the required assessment.

- In the event that an ESP applicant pursues the PPE approach, it is the staff's expectation that application information includes the bounding reactor accident source terms in addition to χ/Q values in order to evaluate the acceptability of the site under the radiological consequence evaluation factors identified in Section 50.34(a)(1). The source terms are expressed in terms of (1) times and rates of fission product appearance into a containment; (2) the isotopic quantities and the chemical forms of fission product released to the environment; and (3) fission product release rates to the environment from the site.

Please contact Ronaldo Jenkins, the ESP Senior Project Manager, at 301-415-2985 if you have any questions on this matter.

Sincerely,

/RA/

James E. Lyons, Director
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Project No. 689

cc: See next page

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